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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/898,124	07/05/2001	Quanbo Zou	IME01-001	2288

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EXAMINER	
SIEW, JEFFREY	

ART UNIT	PAPER NUMBER
1637	10

DATE MAILED: 10/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)	
	09/898,124	ZOU ET AL.	
	Examiner	Art Unit	
	Jeffrey Siew	1637	

-- The MAILING DATE of this communication appears on the c ver sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 July 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25 and 27-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) *7-18 and 27-29* is/are allowed.

6)☐ Claim(s) *1-6,19,20,24 and 25* is/are rejected.

7)☐ Claim(s) *21-23* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

THE FOLLOWING IS A NEW GROUND OF REJECTION NECESSITATED BY THE DISCOVERY OF NEW PRIOR ART

Claim Objections

1. In claim 3 the phrase "there are about..". Active voice is preferred.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4 are rejected under 35 U.S.C. 102(e) as being anticipated by Zou et al (US6,509,186 Jan 21, 2003).

Zou et al teach an apparatus for simultaneously performing multiple independently controlled chemical reactions with a printed circuit board mounted on a heat sink on blocks with having high thermal conductivity, an array of blocks with a chip formed of material with low thermal conductivity, plurality of reaction chambers, heating source and temperature sensor with layer that is softer than 100 and harder than 1 measured in Shore D Durometer and electrical

leads that lead to each source and temperature sensor (see whole doc. esp.col.2 lines 50-55, col. 7 line 34-col 8 line 17). They teach PCR (see col. 1 line 45). They teach a volume less than about 100 microliters and thickness of 30 to 100microns thick (see col. 5 line 17-20). They teach thermal conductivity of layer 101 is 0.2 to 20 W/m.K (see col. 7 line 44). The teach the chip is glass (see col. 7 line 23). They teach valves and injectors to flow reagents (see col. 4 line 28-42).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 19, 24 & 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baier et al (US5,939,312 Aug. 17, 1999) in view of Hunicke –Smith US6132,996 (Oct. 17, 2000) in further view of Ackley et al (US5,733,509 March 31, 1998).

Baier et al teach a miniaturized multi chamber thermocycler (see whole doc. esp. abstract) which contains a heat sink (see figure 3, **41**). They teach a chip (Figure 4) containing reaction chamber symmetrically overlies a single block. They teach that the chip is made of poor heat conductivity such as glass plates and SiO_2 which would provide for greater conductivity within a chamber than between chambers(see col.3 lines 1-15). They teach thermal conductive of 0.6 to 6 W/Km (see col. 3 line 23). They teach up to 6000sample chambers each with 0.1ul volume in one 4" inch wafer which would fall within the dimension range (see col.4 lines 5-10)

Baier et al do not teach sensor or a printed circuit to allow independent control or disposable chips.

Hunicke –Smith teach a printed circuit (see col.11 line 45-60). They also teach temperature sensor (see col. 9 lines 32-35).

Ackley et al teach disposable chips (see col. 2 lines 1-8). **They teach that the substrate can be glass , paper and plastic (see col. 2 line11-12).**

One of ordinary skill in the art would have been motivated to apply Hunicke-Smith's printed circuits to Baieer et al 's device in order to control independent and multiple PCR reactions. Hunicke-Smith state that multiple and separate reactions may be performed (see col. 10 line 43-50). It would have been prima facie obvious to apply Hunicke-Smith's printed circuit to Baier et al's device in order to perform a plurality of PCR reactions amplifying different targets simultaneously.

Moreover one of ordinary skill in the art would have been motivated to apply Ackley et al's teaching of disposable chips to Baier et al's multi chamber device in order to provide premade arrays. As and reusable chips and disposable chips were well known and practiced in

the art, it would have been prima facie obvious to apply Ackley disposable chips to Baier et al's chamber in order to allow the practitioner to easily interchange different probe configurations to identify different targets.

4. Claims 5,6,19, 20, 24 & 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zou et al (US6,509,186 Jan 21, 2003) in view of Ackley et al (US5,733,509 March 31, 1998).

Zou et al teach an apparatus for simultaneously performing multiple independently controlled chemical reactions with a printed circuit board mounted on a heat sink on blocks with having high thermal conductivity, an array of blocks with a chip formed of material with low thermal conductivity, plurality of reaction chambers, heating source and temperature sensor with layer that is softer than 100 and harder than 1 measured in Shore D Durometer and electrical leads that lead to each source and temperature sensor (see whole doc. esp.col.2 lines 50-55, col. 7 line 34-col 8 line 17). They teach PCR (see col. 1 line 45). They teach a volume less than about 100 microliters and thickness of 30 to 100microns thick (see col. 5 line 17-20). They teach thermal conductivity of layer 101 is 0.2 to 20 W/m.K (see col. 7 line 44). The teach the chip is glass (see col. 7 line 23). They teach valves and injectors to flow reagents (see col. 4 line 28-42).

Zou et al do not teach disposable chips.

Ackley et al teach disposable chips (see col. 2 lines 1-8). **They teach that the substrate can be glass , paper and plastic (see col. 2 line11-12).**

One of ordinary skill in the art would have been motivated to apply Ackley et al's teaching of disposable chips to Zou et al's multi chamber device in order to provide premade

arrays. As and reusable chips and disposable chips were well known and practiced in the art, it would have been prima facie obvious to apply Ackley disposable chips to Baier et al's chamber in order to allow the practitioner to easily interchange different probe configurations to identify different targets.

SUMMARY

5. Claims 7-18 are allowable. Concerning claims 7-18 there is no prior art that teach or suggest the claimed apparatus with solder bumps extending downwards from array to provide electrical connections and means for uniformily pressing chip against blocks or the claimed device with heater and sensor on first block partially covered and partially exposed by second block.

Claims 27-29 are allowable and claims 21-23 are free of the prior art but objected to for depending on rejected claim. There is no prior art that teach the claimed device with chip with sidewalls extending downward to touch printed circuit board forming airtight enclosure, or a claimed device with covering case and rods that extend downward to press down on chip or a claimed device with fixture in an inverted orientation with additional heat sink and printed circuit.

The closest prior art is Baier et al who teach a chip for multiple samples but do not teach or suggest solder bumps, Shore D softness, chip sidewalls, covering case with rods, additional printed circuit in inverted orientation or a disposable chip.

CONCLUSION

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey Siew whose telephone number is (703) 305-3886 and whose e-mail address is Jeffrey.Siew@uspto.gov. However, the office cannot guarantee security through the e-mail system nor should official papers be transmitted through this route. The examiner is on flex-time schedule and can best be reached on weekdays from 6:30 a.m. to 3 p.m. If attempts to reach the examiner are unsuccessful, the examiner's supervisor, Gary Benzion, can be reached on (703)-308-1119.

Any inquiry of a general nature, matching or filed papers or relating to the status of this application or proceeding should be directed to the Tracey Johnson for Art Unit 1637 whose telephone number is (703)-305-2982.

Papers related to this application may be submitted to Group 1600 by facsimile transmission. Papers should be faxed to Group 1600 via the PTO Fax Center located in Crystal Mall 1. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CM1 Center numbers for Group 1600 are Voice (703) 308-3290 and FAX (703)-308-4242.

JEFFREY SIEW
PRIMARY EXAMINER

October 13, 2003